

**UNITED STATES DEPARTMENT OF COMMERCE****Patent and Trademark Offic**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/198,849	11/24/98	KANEYAMA	Y P/1929-47

IM22/0328  
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EXAMINER	
ELVE, M	
ART UNIT	PAPER NUMBER
1725	S

03/28/00  
**DATE MAILED:**

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

## Office Action Summary

Application No.  
09/198,849

Applicant(s)

Kaneyama

Examiner

M. Alexandra Elve

Group Art Unit

1725



Responsive to communication(s) filed on \_\_\_\_\_.

This action is FINAL.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

### Disposition of Claims

Claim(s) 1-19 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

Claim(s) \_\_\_\_\_ is/are allowed.

Claim(s) 1-19 is/are rejected.

Claim(s) 10 is/are objected to.

Claims \_\_\_\_\_ are subject to restriction or election requirement.

### Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

The proposed drawing correction, filed on \_\_\_\_\_ is  approved  disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All  Some\*  None of the CERTIFIED copies of the priority documents have been  received.

received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_.

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

### Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). 3 & 4

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

## **DETAILED ACTION**

### *Claim Objections*

1. Claim 10 is objected to because of the following informalities: "disposing the device to confront the substrate in the liquid". What is meant by confront? Is there a chemical reaction or mechanical bonding or alignment of the device to the substrate? Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. Claims 1-2 & 11-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1- it is not clear if the solder has some liquid attached to it or if the soldering is conducted in liquid. Claim 2 -is the ultrasonic vibration applied to the solder or is it used while performing the soldering? Claims 11 & 12 - it is not clear if the ultrasonic vibration is applied to the solder piece/bump or during soldering.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP(I) (197112 Abstract) in view of Sliwa, Jr. (US Pat. 4,990,462) and Sherry (US Pat. 4,763,829).

JP(I) discloses a mounting method in which a eutectic alloy solder is used to join semiconductor elements to a substrate whereby the soldering is conducted while immersed in an inactive liquid. JP(I) does not teach the joining of optical devices, semiconductor or ceramic substrates, printed circuit boards, electrodes or the use of ultrasonic vibration.

Sliwa, Jr. discloses the use of liquid surface tension to aid in assembly of integrated circuits, optoelectronic devices, with ceramic and semiconductor substrates (abstract; col. 21-22, lines 66-68 & 1-5 and col. 23, lines 16-26). Additionally, it is noted that the one of key mechanisms of the liquid with respect to assembly are the ability of the liquid to render mating segments coplanar in preparation for joining. This is done by a configuration which seeks the minimum surface tension (col. 13, lines 33-47). The liquid agent helps control the assembly action forces acting on the segments via. surface tension and viscosity selection to minimize mechanical damage (col. 16, lines 40-68). Flotation liquids may be water, methyl or iso-proryl alcohol, molten indium or other low melting point metals and so forth (col. 18, lines 65-69).

The mother substrate may be a semiconductor, metal or insulation material such as glass or ceramic and may disposed on its surface any desirable combination of receptacle segments and

conventional hybrid-style components and interconnects (col. 23, lines 16-21). Additionally, conventional solder bumps are shown on flip-chips (col. 23, lines 42-45).

It would have been obvious to one of ordinary skill in the art to use semiconductors, optical devices, semiconductor or ceramic substrates, printed circuit boards and electrodes as taught by Sliwa, Jr. because these are merely varieties of semiconductor elements and substrates as used by JP(I).

Sherry discloses a technique for providing solder bumps to electronic components, such as silicon chips, chip carriers and circuit boards. Solder is applied to the surface along with ultrasonic energy so that the solder wets thoroughly (abstract). That is, a wafer is dipped into solder and at the same time ultrasonic energy is applied to the solder by a commercially available ultrasonic horn (col. 3, lines 4-13).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use ultrasonic energy for solder bonding as taught by Sherry to the JP(I) soldering operation because it ensures the integrity of the solder joint.

### *Conclusion*

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP(II) (3060134A, Abstract) & JP(III) (16902, Abstract).

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is (703) 308-0092. The examiner can normally be reached Monday to Friday from 6:30 AM to 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. The fax number for the group is (703) 872-9386.

Any inquiry of general nature to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703) 308-0661.

*M. Alexandra Elve*  
M. Alexandra Elve  
Patent Examiner  
Technology Center 1700

March 17, 2000